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**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Paper No. 25

Application Number: 09/470,741
Filing Date: December 20, 1999
Appellant(s): JIANG ET AL.

Mailed 7/15/03

Christopher K. Gagne
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed on June 2, 2003

***(1) Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

***(2) Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

***(3) Status of Claims***

The statement of the status of the claims contained in the brief is correct.

***(4) Status of Amendments After Final***

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

***(5) Summary of Invention***

The summary of invention contained in the brief is correct.

***(6) Issues***

The appellant's statement of the issues in the brief is correct.

***(7) Grouping of Claims***

The rejection of claims 1-9, 11-21, 23-34 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

***(8) Claims Appealed***

The copy of the appealed claims contained in the Appendix to the brief I scorrect.***(9)***

***Prior Art of Record***

| | | |
|---|---|---|
| 5,262,854 | Ng et al. | 11-1993 |
| 6,215,822 | Bose et al. | 4-2001 |
| 6,175,592 | Kim et al. | 1-2001 |
| 6,222,550 | Rosman et al. | 4-2001 |

Vetro et al. "Frequency domain down-conversion of HDTV using an optimal motion compensation scheme" International Journal of Imaging System and Technolofy col.9, no.4, (August 1998), pp. 1-16

Dugad et al. "A fast scheme of altering resoulution in the compressed domain" Computer Vision and Pattern Recognition, 1999, IEEE Computer Society Conference on. vol. 1, (June 1999), pp. 213-218

***(10) Grounds of Rejection***

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1-7, 9, 11-12, 16-19, 21-24, 28-30 and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article "Frequency domain down-conversion of HDTV using an optimal motion compensation scheme" to Vetro et al. ("Vetro" a refernce of the record). Vetro in view of US5262854 to Ng (a reference of the record) and US 6215822 to Bose et al. (a reference of record).

As to claim 1, Vetro discloses a method of performing video image decoding comprising:

downsampling (down-conversion) a compressed video image in the frequency domain (DCT domain) (Figs. 8 and 9, scheme 1, page 9, section 4.1 and page 10, section 4.2);

inverse transforming (IDCT) the downsampled video image (Figs. 8 and 9, scheme 1, page 9, section 4.1 and page 10, section 4.2); and

performing motion compensation for the downsampled image in the spatial domain (page Fig. 3b, page 4, section 2 and pages 11, section 4.3).

Vetro further discloses downscaling the motion vector (pages 10-12) but does not explicitly scaling motion vectors in according with the downsampling ratio.

Ng, in an analogous environment, discloses performing motion compensation comprises scaling (element 313) motion vectors in according with the downsampling ratio (Fig. 5, col. 6 lines 1-7 note that both two decimators have same down sampling ratio 2, i.e. 8x8 block to 4x4 block).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the scheme of Ng in the method of Vetro in order to improve the image reconstruction accuracy (Ng, col. 1 lines 45-47 and col. 6 lines 8-45, Vetro, abstract). Doing so would convert the format of the motion vector so as to improve accuracy of image reconstruction so that the quality of the method is improved.

Both Vetro and Ng do not explicitly mention "the motion vector specifying relative distance of reference data from a macroblock". However, the definition of the motion

vector in MPEQ is the relative distance from a reference macroblock to a predicted macroblock. Thus, the claim language is inherent in the definition of the motion vector because both Vetro and Ng use MPEQ for image compression (Vetro, abstract, Ng. Col. 2 lines 13-49).

Even if assuming it is not inherent, for the sake of argument, the limitation is well known in the art.

Bose, in an analogous environment, explicitly teaches limitation (col. 17, lines 4-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the scheme of Bose in the method of Vetro in order to improve the image reconstruction accuracy and efficiency (Bose, col.3-col. 4, Vetro, abstract).

As to claim 16, Vetro discloses a method of performing video image decoding comprising:

inverse transforming (IDCT) the a compressed video image (Figs. 8 and 9, scheme 2, page 9, section 4.1 and page 10, section 4.2);

downsampling (down-conversion) a compressed video image in the spatial domain (Figs. 8 and 9, scheme 2, page 9, section 4.1 and page 10, section 4.2); and

performing motion compensation for the downsampled image in the spatial domain (page Fig. 3b, page 4, section 2, and page 11, section 4.3).

Vetro further discloses downscaling the motion vector (pages 10-12) but does not explicitly mention performing motion compensation comprises scaling motion vectors in according with the downsampling ratio.

Ng, in an analogous environment, discloses performing motion compensation comprises scaling (element 313) motion vectors in according with the downsampling ratio (Fig. 5, col. 6 lines 1-7 note that both two decimators have same down sampling ratio 2, i.e. 8x8 block to 4x4 block).

Both Vetro and Ng do not explicitly mention "the motion vector specifying relative distance of reference data from a macroblock". However, the definition of the motion vector in MPEQ is the relative distance from a reference macroblock to a predicted macroblock. Thus, the claim language is inherent in the definition of the motion vector because both Vetro and Ng use MPEQ for image compression (Vetro, abstract, Ng, col. 2 lines 13-49).

Even if assuming it is not inherent, for the sake of argument, the limitation is well known in the art.

Bose, in an analogous environment, discloses the limitation (col. 17, lines 4-25).

Analogous argument is addressed with respect to claim 1.

As to claims 2 and 17, Vetro further discloses wherein the compressed video image in the frequency domain comprises a discrete cosine transform image (Figs. 8 and 9, scheme 1, page 9, section 4.1 and page 10, section 4.2).

As to claims 3 and 18, Vetro further discloses the DCT image is stored as complying with an MPEG specification (Abstract, note that the DCT image of Vetro is

inherently stored as MPEG because the Vetro method is to solve the drift and block artifact problems of MPEG-2 and also Vetro, page 11, section 5).

As to claim 4, Vetro further discloses the DCT image is stored as a frame type image (Fig. 8 , scheme 1, page 9, section 4.1).

As to claim 5, Vetro further discloses the motion compensation data signals are stored as frame prediction type motion compensation (page 11, section 4.3).

As to claim 6, Vetro further discloses the DCT image is stored as a field type image (Fig. 9 , scheme 1, page 10, section 4.2).

As to claim 19, all elements are addressed with regard to claims 4 and 6.

As to claims 7 and 21, Vetro further discloses the motion compensation data signals are stored as field prediction type motion compensation (page 11, section 4.3).

As to claim 9, Vetro further discloses the downsampling is performed using an integer ratio( Fig. 6, page 6, note that 16x16 DCT macroblock is down-conversion to 8x8 DCT macroblock and the ratio is 2).

As to claim 22, Vetro further discloses the step of performing motion compensation comprises scaling motion vectors in according with a downscaling ratio (Fig. 3b, page 4-5, section 2, note that the downconversion spatial filter x is inherently of a downscaling ratio).

As to claim 23, Vetro further discloses wherein motion vector compensation comprises implementing an interpolation operation (Fig. 3b, page 4, section 2, and page 11, section 4.3 note that equation (1) is an interpolation operation).

As to claim 24, Vetro further discloses motion compensation scaling implementing a bilinear interpolation operation (page 12, note that 4x4 cut with bilinear interpolation).

As to claims 11-12, the discussions are addressed with regard to claims 22-23, respectively.

As to claim 28, Vetro discloses elements such as downsampling in frequency domain, inverse transforming, and motion compensation (the discussions are addressed with regard to claims 1-3, respectively) but does not explicitly mention an article comprising: a storage medium, having stored thereon instructions, that when execute by a platform and scaling motion vectors in according to a downsampling ratio.

Ng, in an analogous environment, discloses an article result in following : a storage medium, having stored thereon instructions, that when execute by a platform, result in IDCT, motion compensating, and MPEG (Fig. 3, element 302, col. 3 line 58-col. 4 line 42, note that the controller 302, as a state machine, is inherently to have a storage medium storing the program (instructions) executed by a platform because of the programmed routines), and performing motion compensation comprises scaling (element 313) motion vectors in according with the downsampling ratio (Fig. 5, col. 6 lines 1-7 note that both two decimators have same down sampling ratio 2, i.e. 8x8 block to 4x4 block).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the scheme of Ng in the method of Vetro in order to improve the image reconstruction accuracy (Ng, col. 1, lines 45-47 and col. 6 lines 8-

45, Vetro, abstract). Doing so would convert the format of the motion vector so as to improve accuracy of image reconstruction so that the quality of the method is improved.

Both Vetro and Ng do not explicitly mention "the motion vector specifying relative distance of reference data from a macroblock". However, the definition of the motion vector in MPEQ is the relative distance from a reference macroblock to a predicted macroblock. Thus, the claim language is inherent in the definition of the motion vector because both Vetro and Ng use MPEQ for image compression (Vetro, abstract, Ng. Col. 2 lines 13-49).

Even if assuming it is not inherent, for the sake of argument, the limitation is well known in the art.

Bose, in an analogous environment, discloses the limitation (col. 17, lines 4-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the scheme of Bose in the method of Vetro in order to improve the image reconstruction accuracy and efficiency (Bose, col. 3-col. 4, Vetro, abstract). Doing so would improve accuracy and efficiency of image reconstruction so that the quality of the method is improved.

As to claims 29-30, the discussions are addressed with regard to claims 2-3, respectively.

As to claim 32, Vetro discloses elements such as downsampling in spatial domain, inverse transforming, and motion compensation (the discussions are addressed with regard to claim 16) but does not explicitly mention an article result in following: a storage medium, having stored thereon instructions, that when execute by a

platform and does not explicitly mention performing motion compensation comprises scaling motion vectors in according with the downsampling ratio.

Ng, in an analogous environment, discloses an article comprising: a storage medium, having stored thereon instructions, that when execute by a platform, result in IDCT, motion compensating, and MPEG (Fig. 3, element 302, col. 3 line 58-col. 4 line 42, note that the controller 302, as a state machine, is inherently to have a storage medium storing the program (instructions) executed by a platform because of the programmed routines), and performing motion compensation comprises scaling (element 313) motion vectors in according with the downsampling ratio (Fig. 5, col. 6 lines 1-7 note that both two decimator have same down sampling ratio 2, i.e. 8x8 block to 4x4 block).

Both Vetro and Ng do not explicitly mention "the motion vector specifying relative distance of reference data from a macroblock". However, the definition of the motion vector in MPEQ is the relative distance from a reference macroblock to a predicted macroblock. Thus, the claim language is inherent in the definition of the motion vector because both Vetro and Ng use MPEQ for image compression (Vetro, abstract and page 11, Ng. col. 2 lines 13-49).

Even if assuming it is not inherent, for the sake of argument, the limitation is well known in the art.

Bose, in an analogous environment, discloses the limitation (col. 17, lines 4-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the scheme of Bose in the method of Vetro in order to

improve the image reconstruction accuracy and efficiency (Bose, col. 3-col. 4, Vetro, abstract). Doing so would improve accuracy of image reconstruction so that the quality of the method is improved.

An analogous argument with regard to combining Vetro and Ng is addressed with regard to claim 28.

As to claims 33-34, the discussions are addressed with regard to claims 2-3, respectively.

2. Claims 14 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vetro, Bose and Ng in view of the article "A fast scheme for altering resolution in the compressed domain" to Dugad et al. ("Dugad" a reference of the record).

As to claims 14 and 26, Vetro further discloses the downsampling comprises implemented a linear filter (Page 5, equation 6 and 7) but does not explicitly mention the bilinear interpolation which is well known in the art.

Dugad, in an analogous environment, discloses using the well known bilinear interpolation scheme for downsampling (Fig. 3, page 216, section 4).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the scheme of Dugad in the method of Vetro in order to decrease the computational burden and directly downsample in compression domain (Dugad, page 213, section 1). Doing so would utilize the linear property of DCT transform so as to decrease the computational time so that the efficiency of the method is improved.

3. Claims 8 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vetro, Bose, and Ng., further in view of US 6175592 to Kim ("Kim" a reference of the record).

As to claim 8, the combination of Vetro and Ng does not mention displaying downsampled spatial image that appear substantially uniform on a computer monitor.

Kim, in an analogous environment, discloses displaying the downsampled spatial image so that resulting non uniform vertical spacing of data signal lines (for example, 3:1 decimation) that appear substantially uniform on low resolution screen of a monitor (Figs. 2a, 2b, 9a, and b, col. 2 lines 16-18, col. 7 lines 3-20, col. 16, lines 1-14, and col. 20 lines 23-64, note that vertical interpolation, especially for even/odd field, creates uniform downsampled image in vertical direction).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the scheme of Kim in a computer monitor in the method of Vetro in order to enhance the quality of the decimated image (Kim, col. 20 lines 24-27). Doing so would create substantial uniform downsample image in raster format to display on the screen in a computer monitor by the vertical interpolation so that the quality of the method is improved.

As to claim 31, the combination of Vetro and Ng does not mention displaying downsampled spatial image that appear substantially uniform on a computer monitor.

Kim, in an analogous environment, discloses displaying the downsampled spatial image so that resulting non uniform vertical spacing of data signal lines (for example, 3:1 decimation) that appear substantially uniform on low resolution screen of a

monitor (Figs. 2a, 2b, 9a, and b, col. 2 lines 16-18, col. 7 lines 3-20, col. 16, lines 1-14, and col. 20 lines 23-64, note that vertical interpolation, especially for even/odd field, creates uniform downsampled image in vertical direction).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the scheme of Kim in a computer monitor in the method of Vetro and Ng in order to enhance the quality of the decimated image (Kim, col. 20 lines 24-27). Doing so would create substantial uniform downsample image in raster format to display on the screen in a computer monitor by the vertical interpolation so that the quality of the method is improved.

4. Claims 15 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Vetro, Ng, Bose and Dugad, further in view of US 6222550 to Rosman et al. ("Rosman" a reference of the record).

As to claims 25 and 27, the combination Vetro, Ng, Boses and Dugad discloses bilinear interpolation but does not mention 3D pipeline which is well known in the art.

Rosman, in an analogous environment, discloses using 3D pipeline to perform the bilinear interpolation (Fig. 3, col. 1, lines 8-9, col. 12, lines 5-27).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the pipeline scheme of Rosman in the method of Vetro and Dugad in order to increase computing speed and performance (Vetro, abstract, Dugad, page 213 section 1, Rosman, col. 1 lines 38-42 and col. 11, lines 7-44). Doing so would increase the computing speed for the bilinear interpolation by using the 3D pipeline so that the efficiency of the method is improved.

***(11) Response to Argument***

(A) The following discussion relates to the rejection of claims 1-7, 9, 16-19, 21-24, 28-30, and 32-34 under 35 U.S.C. 103(a) as being unpatentable over the combination of Vetro et al., Ng., and Bose et al.

1. Appellants' argument---- Appellant argues that '**Significantly, as is acknowledged by the Examiner at page 3 and 5 of the Final Office Action, Vetro et al. does not discloses "performing motion compensation for the downsmpled image in the spatial domain, the performing of motion compensation comprising scaling a motion vector in accordance with a downsampling ratio, the motion vector specifying relative distance of reference data from a macroblock,**" (page 29, paragraph 1).

Examiner's response ---- The Examiner does not agree with Appellant. There is no acknowledgement by the Examiner on pages 3 and 5 of the Final Office Action for the Appellant's quoted claim language. Contrary to Appellant's quotation, the Examiner only mentions that Vetro does not teach "scaling a motion vector in according to a downsampling ratio". Furthermore, Vetro clearly discloses a method of frequency domain down-conversion of HDTV (title, page 5-8, section 3) to downsample a compressed video image in the frequency domain (DCT domain, note that Vetro teaches a similar method to that of Appellant's for frame and field downsampling of MPEQ compressed data). Vetro further discloses a step of performing motion compensation for the downsampled image in the spatial domain and the step of scaling (down conversion) a motion vector to perform the motion compensation (Fig. 3, page 4-

5, section 2 and page 11, section 4.3). Moreover, Vetro mentions that scaling the motion vector in according with a downsampling ratio such as down conversion filters a, b, c, and d (page 4) and the claim language "in according with **a downsampling ratio**" (emphasis by the Examiner) could be read on by Vetro's down conversion filter. However, the Examiner has narrowly read the claim language as the scaling the motion vector relating to the downsampling ratio for the downsampled image as described in page 13 in the specification. Thus, the Examiner has cited Ng to show that even if the claim language has been read narrowly, "scaling a motion vector in according to a downsampling ratio" is still well known in the art. Ng is also related to processing HDTV image data and using MPEQ standard to compress image.

Appellant has amended the independent claims in paper #15 (preliminary amendment after CPA filling) and added "the motion vector specifying relative distance of reference data from a macroblock". However, the added claim language has been neither further limiting the claims nor adding any weight of patentability. Because the added language is the definition of motion vector of MPEQ standard, which is a vector specified or represented the vertical and horizontal displacement or distance between the macroblock being encoded and the macroblock-sized area in the reference image. The Examiner indicated that the language is inherent because both Vetro (abstract, page 11) and Ng (col. 2 lines 13-49) used MPEG standard to compress the image (note that more argument related to the feature is inherent can be found in response A(2)). Nevertheless, for the sake of argument, the Examiner has further cited Bose to show the Appellant that the feature is indeed well known in the art. Bose expressly mentioned

"---- the luminance or 4:2:2 chrominance data of a full frame macroblock Sp of a P-picture, say in buffer 73B, is to rewritten with a 16x16 pel square 90 (superimposed on Fig. 12 for illustration) of data from a reference I- or P- picture that is displaced, **as specified by a motion vector 88, at some relative vertical and horizontal distance** in buffer 73A." (Fig. 12 and 12a, col. 17-col. 18, note that Figs. 12 and 12A illustrated the motion vector 88 as relative distance of the reference data 98 and the macroblock 90).

Therefore, Appellant's argument is baseless and incorrect.

2. Appellants' argument---- Appellant argues that Examiner asserted that "the claim language is inherent in the definition of the motion vector. ---- However, the Examiner has provided no specific prior art citation to support this assertion. During the prosecution of the subject application, Appellants repeatedly requested, pursuant to MPEP § 2144.03, that the Examiner supply a specific citation to a prior art reference to support the Examiner's assertion, or withdraw the Examiner's assertion. To date, contrary to the provisions of the MPEP, the Examiner failed to supply any such evidence, but nevertheless, maintains his factually unsupported claim rejection!" (page 31, paragraph 1). Appellant further argues that "Additionally, as stated above, the respective definitions and uses of the "motion vectors" are irreconcilably different from each other. Accordingly, as a matter of logic, the Examiner's assertion that the definition of the claim language "motion vector" recited in Applicant's claim is "inherently" disclosed in both Vetro et al. and Ng clearly is in error." (page 31, paragraph 2).

Examiner's response ---- The Examiner does not agree with Appellant. First, MPEP § 2144.03 is a rule for reliance on common knowledge in the art or "well Known" prior art, and is not a rule for requirements of rejection based on inherency. The Examiner rejected the claim language "the motion vector specifying relative distance of reference data from a macroblock" based on inherency by Vetro or Ng, and did not use common knowledge or Official Notice, nor "well known" prior art. Thus, Appellant misunderstood and misapplied the MPEP§ 2144.03 to the rejection by the Examiner based on inherency and imposed unfair burdens on the Examiner. Nevertheless, the Examiner treated this uncorrected request by the Appellant through indicating that "both Vetro and Ng used MPEQ standard, therefore, the claimed language should be inherent" (paper #22). In fact, Vetro **expressly** mentions using MPEQ2 in abstract and page 11, section 5 and Ng **expressly** mentions using MPEQ in column 2 lines 13-49. Thus, since the definition of motion vector of MPEQ is the relative distance (vertical and horizontal displacements) from the macroblock being encoded to the maching macroblock-sized area in the reference image and either Vetro or Ng used MPEQ standard, the inherency rejection by the Examiner is correct. Furthermore, the fact that Appellant has admitted the prior art "ISO/IEC 13818-2 MPEG-2 Video Coding Standard, "Information Technology --- Generic coding and moving pictures and associated audio information: video" March, 1995" in page 2 of the specification indicates that Appellant not only have possessed a prior art for the definition of the motion vector but also would have known the definition of the motion vector of MPEQ. Moreover, the Examiner has cited Bose, for the sake of argument, to show the feature is well known, which indirectly

addresses the request of Appellant. Bose expressly mentioned the motion vector as a relative distance between the macroblocks of two frames (see A(1)).

Finally, the Examiner believes whether the motion vectors are the same in Vetro and Ng or not is irrelative to the inherency rejection because if either Vetro or Ng teaches using MPEQ , the reasoning of inherency should be established. Regardless of irreconcilable differences of motion vectors as Appellant asserted (note that the difference of the motion vectors between Vetro and Ng is addressed in A(3)), the definition of motion vector in MPEQ is only one, and as long as either Vetro or Ng teaches using MPEQ, the rejection based on the inherency is correct. Appellant apparently and **illogically** believes that the rejection based on inherency to the claim language relating to the motion vector must be relied on both Vetro and Ng.

Therefore, Appellant's argument is illogical, and wrong.

3. Appellants' argument---- Appellant argues that Ng defines as "Motion vectors ---- are codewords which identify 8 by 8 blocks of pixels in frames from which predicted frames are generated, which blocks most closely match the block currently being processed in the frame currently being encoded." (page 29 paragraph 3) and the motion vector defined in Ng. is "Contrary to the Examiner's assertions, the "motion vectors" disclosed in Vetro et al. are vastly different in purpose, effect, result, and operation from the "motion vectors" disclosed in Ng." (page 30, paragraph 2). Appellant still further argues that "---- there is no motivation or suggestion in any of the this prior art to selectively combine the teachings of Vetro et al., Bose et al., and Ng in the manner contemplated by the Examiner. Additionally, given the stark differences

between the "motion vectors" disclosed in Vetro et al., Bose et al., and Ng, none of this prior art, whether taken singly or in any combination can be said to suggest to those skilled in the art either the desirability of the selective combination of teachings of Vetro et al. and Ng proffered by the Examiner, or a reasonable likelihood of success of this selective combination." (page 30, paragraph 2) and " ---- the respective definitions and uses of the "motion vectors" disclosed in Vetro et al., Ng, and Bose et al. are mutually different, are irreconcilably in consistent with each other, --- No guidance is supplied by any of the prior art relied upon by the Examiner that would resolve their mutually contradictory teachings so as to suggest the selective combination of teachings proffered by the Examiner." (page 31, paragraph 3 – page 32, paragraph 1).

Examiner's response ---- The Examiner does not agree with Appellant. However, in response to applicant's argument, Examiner would like to point out that claim language is given its broadest reasonable interpretation. First, the claim language is "motion vector". Thus, any motion vector, regardless of calling a vector or a codeward, can be read on the claim language. Furthermore, a motion vector as a vector can be viewed as either a vector or a codeword or even as a point in an vector space depending on how the user views it. However, regardless of the view of the user or the name, the definition of a motion vector defined in MPEQ is the only one that is the relative distance (vertical and horizontal displacements) from the macroblock being encoded to the matching macroblock-sized area in the reference image. The motion vector can identify or specify another macroblock because it is the relative distance between the two blocks as defined in its definition. In the instant case, the motion

vectors in Ng are codewords which identify a 8x8 block of pixels as applicant pointed out, and Vetro also discloses that the motion vectors in Vetro are also vectors used to specify the neighborhood of blocks (page 11, section 4.3). in addition, Bose clearly illustrates that the motion vector is the relative distance between the macroblocks (Figs.12 and 12a, col. 17 line 4-col. 18 line 55). One ordinary skill in the art can not say that there are "vastly different in purpose, effect, result, and operation" just because Vetro and Bose calls the motion vector as a vector and Ng calls the motion vector as a codeword. Contrary to Appellant's assertion, in fact, the purpose, the effect, and the result of using the motion vector in both Vetro and Ng are the same, i.e. obtaining better and faster motion compensation (Vetro, page 4-5, section 2 and page 11, section 4.3; Ng, col. 5 line 30-col. 6 line 53). Furthermore, the operations of the motion vectors in both Vetro and Ng are similar (Vetro, Fig. 2 and 3, Ng, Fig. 5, note that they both downscale the motion vectors and then for the motion compensation). Moreover, Vetro, Ng, and Bose all use MPEQ standard as discussed in A(1) and A(2). It is incorrect and baseless for the Appellant to make the assertion that Vetro's motion vectors "are vastly different in purpose, effect, result, and operation from the "motion vectors" disclosed in Ng" and Bose because if anyone expressly mentions he uses MPEQ, he must use the motion vector as the specification of MPEQ standard, and he can not have a motion vector having a different purpose, effect, result, and operation specified in the MPEQ standard. Accordingly, there are no mutual differences or irreconcilable inconsistencies of the motion vectors defined in Vetro, Ng, and Bose.

Regarding to the argument of motivation to combine the Vetro, Ng, and Bose, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In the instant case, first, Vetro, Ng and Bose are in the HDTV image processing field (Vetro, page 2; Ng, abstract; Bose, col. 7 lines 31-33). Both Vetro and Ng are especially for low resolution motion compensation. Vetro clearly discloses a method and an apparatus for low-resolution motion compensation. Although Vetro does not show that scaling a motion vector in according with a downsampling ratio, such processing techniques is taught by Ng (Fig. 5, col. 6 lines 1-7). Moreover, Ng uses the techniques to improve the image quality and reconstruction accuracy (Ng. col. 6 lines 8-45), which is problem intended to be solved in Vetro (abstract). Bose is cited, for sake of argument, to show that the motion vector is the relative distance between the two macroblocks is well known. Finally, since the knowledge or suggestion to modify the teachings of the prior art to produce the claimed invention are all contained in Vetro, Ng, and Bose, it has apparently taken in to account only knowledge from the patents themselves. The obviousness to combine the references is properly established. Also, according to the extensive discussion above related to the differences of the motion vectors defined by Vetro, Ng, and Bose, there are no mutual differences or irreconcilable inconsistencies of the motion vectors defined

in Vetro, Ng, and Bose, and Vetro, Ng, and Bose all use MPEQ standard and all use the motion vector for the motion compensation. Therefore, such reconstruction is proper and prima facie case of obviousness has been established.

Regarding the "guidance' requested by the Applicant to combining the references, Examiner recognizes the test for obviousness is not whether the features of the reference may be bodily incorporated into the other to produce the claimed subject matter but simply what the references make obvious to one of ordinary skill in the art. In Re Bozek, 163 USPQ 545, (CCPA 1969); In re Richman 165 USPQ 509, (CCPA 1970); In re Beckum, 169 USPQ 47(CCPA 1971); In re Sneed, 710 F.2d 1544, 218 USPQ 385. In the instant case, all claimed limitations are disclosed in the references (see A(1), A(2) and above). The guidance to combine the teachings is and has been always the objective standard, i.e., "produce the claimed subject matter but simply what the references make obvious to one of ordinary skill in the art.", rather than the Appellcant's demand that "the features of the reference may be bodily incorporated into the other to produce the claimed subject." According to the guidance, the references clearly show that all claimed limitations are either inherent or well known in the art, the reproduction of the claimed subject matters from the references makes obvious to one of ordinary skill in the art because the motivations of combining them are presented in the references. For example, the scheme of Ng would be used in the method of Vetro to improve the image quality and reconstruction accuracy (Ng. Fig. 5, col. 6 lines 8-45), which is problem intended to be solved in Vetro (abstract).

4. Appellants' argument---- Appellant argues that "---- these definitions cannot properly be characterized as lacking "significant differences" that would prohibit the selective, mosaic, combination proffered by the Examiner. This clearly evidences the fact the Examiner's selective combination of Vetro et al., Ng, and Bose et al. is based upon improper hindsight!" (page 32, paragraph 4) and "---- even a casual reading of these portions of Bose et al. and Vetro et al. reveals that these portions of Bose et al. and Vetro et al. do not explicitly provide such motivation, but instead, clearly evidences that the Examiner has relied upon hindsight." (page 33, paragraph 1).

Examiner's response ---- The Examiner does not agree with Appellant. First, the Examiner does not fully understand the reasoning logic of the Appellant. The argument of the Examiner cited by the Appellant is regarding the differences between the definitions of the motion vectors in both Vetro and Ng (see A(3) for detailed discussion). That argument does not have anything to do with the motivation to combine the references of Vetro and Ng, nor is it even related to Bose. Thus, the Appellant's assertion of improper handsight to combine Vetro, Ng, and Bose is illogical and incorrect. Furthermore, in response to the Appellant's argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See In re McLaughlin, 443 F.2d 1392, 170 USPQ 209 (CCPA

1971). As can be seen from the rejection, when combining Vetro, Ng, and Bose, it has taken in to account only knowledge which was within the level of ordinary skill, i.e. knowledge from the patents themselves (see also A(3)). For example, Vetro provides the knowledge for the motivation of "Although the quality is very good (for fully decoded image, noted by the Examiner), the cost of such a system is quite high due to large memory requirements. ---- Two problems arise from the method (previous method, noted by the Examiner): first, the discarding of high frequency data will introduce a disturbing amount of drift, and second, severe blocking artifacts will result in areas of large motion." (Vetro, abstract). Ng also provides the knowledge for the motivation of "the requirement of less memory and slower memory can effect a significant cost saving in a lower resolution receiver" (col. 1 lines 45-47) and "to understand how this process improves image reconstruction accuracy refer to Figs. 5and 6 --- In the decimated domain the choice of alternative matrices, which are relatively displaced by a row and/or column, provides a half pixel improvement (with respect to subsampled images) in the accuracy of the reconstructed reduced resolution image." (col. 6, lines 8-45). In fact Ng's teaching of scaling a motion vector in according with a downsampling ratio improves the image quality and reconstruction accuracy and reduces the requirement of the memory, which is a problem intended to be solved in Vetro. In addition, Bose provides the knowledge for motivation of "---- the storage and retrieval of data of individual pels can adversely affect the efficiency of the decoding process. ---- a straight –forward storage and retrieval of luminance and chrominance data in the order it is received can complicate and substantially slow the decoding process.---- there is a

need for an effective and efficient memory scheme, particularly for performing Motion Compensation Prediction and post filtering." (Bose, col. 3-col. 4). By incorporating the scheme of Bose that has the teaching of the motion vector being the relative distance between the macorblocks (see A(1) for detailed discussion) into the method of Vetro, the accuracy and efficiency (less memory used) of image reconstruction is improved. Finally, the combination of Vetro, Ng, and Bose takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper and is not hinsight.

Therefore, the assertion of hindsight by the Appellant is illogical and wrong.

5. Appellants' argument---- Appellant argues that Appellant further argues in footnote1 (page 29) that "Vetro et al. nowhere teaches that the DCT image in Vetro et al. is stored in compliance with an MPEQ specification. During the prosecution of the subject application, Appellants have repeatedly traversed this assertion by the Examiner, and requested pursuant to MPEP § 2112, that the either withdraw this assertion, cite a specific passage in Vetro et al. that teaches that the DCT image is stored in compliance with an MPEQ specification, or cite a specific passage in Vetro et al. that indicates this is necessary to Vetro et al.'s disclosed techniques. To date, the Examiner has failed to provide a response to these requests." (page 29). Appellant further argues in footnote 2 that "Appellants repeatedly requested, pursuant to MPEP § 2144.03, that the Examiner supply a specific citation to a prior art reference to support the Examiner's assertion," which is incorporating the scheme of Bose would improve

accuracy of image reconstruction so that the quality of the method is improved (page 30). Appellant still further argues in footnote 3 that "the Examiner appears to have withdrawn the Examiner's previous assertion that Ng discloses an MPEG or MPEG-like system. However, the Examiner has yet provide any evidence to support the Examiner's suggestion in the Final Office Action that the MPEG definition of "macroblock" is inherently disclosed in NG." (page 31).

Examiner's response ---- The Examiner does not agree with Appellant. The Examiner was confused by the request in footnote with fine print font by the Appellant because the Examiner does not know the real purpose of the footnote by the Appellant. The Examiner assumed that the footnotes put by the Appellant were not important to the Appellant, otherwise those requests or arguments would have been in the main content of the response or the brief, not in the footnotes. In addition, the Examiner can not find a rule in MPEP regarding how to response a footnote in a response by Applicant. Thus, the Examiner did not directly response the footnotes in the amendments. Since the Appellant uses the footnotes to enhance his arguments in the Appeal Brief, the Examiner would like to directly respond those footnotes.

Regarding the footnote 1, the Examiner indirectly responded to the request raised in the footnote 1 by explaining the rationale or evidence tending to show inherency required by MPEP § 2112. In the paper# 20, page 7, the Examiner has supplied the citation and further given the reason that the DCT image is stored as complying with a MPEQ specification is inherent in Vectro because what Vetro does is try to solve the drift and block artifact problems of MPEQ-2. All DCT image or

coefficients of the macroblocks must be stored in according with MPEQ standard (Fig. 5) so that the method of Vetro can be used to down-conversion and optimally motion compensate and thus, solve the drift and block artifact problems of MPEQ-2.

Regarding the footnote 2, the Examiner repeatedly and indirectly responded to the footnote request in paper# 20 and paper# 22, especially in pages 2-4 in paper #20. Appellant's request represents an improper bodily incorporating the references and the Examiner responses are presented in page 4 of paper #20. In addition, Vetro addresses the need of improving the accuracy of the reconstructed image by reducing the drift and the block artifact (abstract). The argument of the combination of Vetro, Ng, and Bose to achieve the improvements on the accuracy and efficiency of the image reconstruction is addressed with regard to A(4).

Regarding the footnote 3, the Examiner repeatedly and indirectly responded to the footnote request in paper #11 and paper# 20 by mentioning that Ng used MPEQ standard. First, the inherency reasoning related to the definition of the motion vector is addressed in detail in A(2). In fact, Ng **expressly** mentions numeral time of using MPEQ in column 2 lines 13-49, column 3, lines 50-52, column 4 lines 19-20 and column 7, lines 62-64. moreover, a casual read or even skimming the first page of context in Ng would have found the support of the inherency. Finally, the Examiner addressed the request indirectly (the rejection of claim 32) in page 8 of paper #20 by indicating that "Ng, ----discloses----MPEQ (----col. 3 line 58-col. 4 line 42)" (note that "MPEQ-like" appears in col. 4 lines 19-20).

(B)The following discussion relates to the rejection of claims 14 and 26 under 35 U.S.C. 103(a) as being unpatentable over the combination of Vetro et al., Ng., Bose et al and Dugad et al.

1. Appellants' argument---- Appellant argues that "Dugad et al. nowhere discloses or suggests the aforesaid combination of limitations of Appellants' independent claims 1 and 16 are missing from Vetro et al., Ng, and Bose et al." (page 34 paragraph 1), "none of this prior art can be said to provide any guidance that would be resolve the mutually contradictory teachings of Vetro et al., Ng, and Bose et al." (page 34 paragraph 2), and "---- Examiner's rejection of claims 14 and 26 is based on no less than four isolate prior art documents that contain no teaching or suggestion to selectively combine their respective teachings in the manner contemplated by the Examiner. Clearly, this evidences that fact that the Examiner has engaged in improper hindsight to reject claims 14 and 26!" (page 34, paragraph 3).

Examiner's response ---- The Examiner does not agree with Appellant. First, there is no relationship between how many prior art used to combine and the improper hindsight as alleged by the Appellant. Furthermore, Dugad is only cited to show that a bilinear interpolation for downsampling is well known in the art (Fig. 3, page 216, section 4). The validity of combining Vetro, Ng, and Bose (independent claim 1 and 16) is addressed in (A) 1-5. Also, the argument related to the "guidance" is addressed with regard to A(3). In addition, Dugad uses the scheme for solving the problem of altering resolution in compressed domain (DCT domain) (page 213) which is the problem Vectro (abstract) tried to solve. Moreover, the Examiner recognizes that any judgment

on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See In re McLaughlin, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Dugad provides the motivation of "--- produces visually sharper images and gives significant improvements in PSNR----" and "The straightforward approach of decompressing , carrying out the downsampling in spatial domain and then recompressing involves unnecessary work and is computationally too intensive to be feasible in real time----" to combine the references. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the scheme of Dugad in the method of Vetro in order to decrease the computational burden and directly downsample in compression domain (Dugad, page 213, section 1). Doing so would utilize the linear property of DCT transform so as to decrease the computational time so that the efficiency of the method is improved. Finally, since the combination of the references takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made which includes in Dugad article, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper.

(C) The following discussion relates to the rejection of claims 8 and 31 under 35 U.S.C. 103(a) as being unpatentable over the combination of Vetro et al., Ng., Bose et al and Kim et al.

1. Appellants' argument---- Appellant argues that "Kim et al. nowhere discloses or suggests the aforesaid combination of limitations of Appellants' independent claims 1 and 16 are missing from Vetro et al., and Ng." (page 35 paragraph 1), and "none of this prior art can be said to provide any guidance that would be resolve the mutually contradictory teachings of Vetro et al., Ng, and Bose et al." (page 35 paragraph 2).

Examiner's response ---- The Examiner does not agree with Appellant. Kim is only cited to show that displaying a downsampled image that aappear substantially uniform on a computer monitor is well known in the art. The validity of combining Vetro, Ng, and Bose (independent claim 1 and 16) is addressed in (A) 1-5. Also, the argument related to the "guidance" is addressed with regard to A(3). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the scheme of Kim in a computer monitor in the method of Vetro and Ng in order to enhance the quality of the decimated image (Kim, col. 20 lines 24-27). Doing so would create substantial uniform downsample image in raster format to display on the screen in a computer monitor by the vertical interpolation so that the quality of the method is improved

(D) The following discussion relates to the rejection of claims 15 and 27 under 35 U.S.C. 103(a) as being unpatentable over the combination of Vetro et al., Ng., Bose et al., Dugad et al., and Rosman et al.

1. Appellants' argument---- Appellant argues that "Rosman et al. nowhere discloses or suggests the aforesaid combination of limitations of Appellants'

independent claims 1 and 16 are missing from Vetro et al., Ng, and Bose et al." (page 35 paragraph 1), "none of this prior art can be said to provide any guidance that would be resolve the mutually contradictory teachings of Vetro et al., Ng, and Bose et al." (page 35 paragraph 2), and the Examiner's rejection of claims 15 and 27 "is based on no less than five isolate prior art documents that contain no teaching or suggestion to selectively combine their respective teachings in the manner contemplated by the Examiner. Clearly, this evidences that fact that the Examiner has engaged in improper hindsight to reject claims 14 and 26!" (page 35, paragraph 3).

Examiner's response ---- The Examiner does not agree with Appellant. First, there is no relationship between how many prior art used to combine and the improper hindsight as alleged by the Appellant. Furthermore, Rosman is only cited to show that a 3D pipeline to perform bilinear interpolation for downsampling is well known in the art (Fig. 3, col. 1, lines 8-9 and col. 12 lines 5-27). The validity of combining Vetro, Ng, and Bose (independent claim 1 and 16) is addressed in (A) 1-5. Also, the argument related to the "guidance" is addressed with regard to A(3). In addition, Rosman uses the scheme for increasing the computation speed which is the problem tried to be solved by Vectro (abstract) and Dudad (page 231, section 1). Moreover, the Examiner recognizes that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See In re McLaughlin, 443 F.2d 1392, 170 USPQ 209 (CCPA

1971). Dugad provides the knowledge of motivation for "--- produces visually sharper images and gives significant improvements in PSNR----" and "The straightforward approach of decompressing , carrying out the downsampling in spatial domain and then recompressing involves unnecessary work and is computationally too intensive to be feasible in real time----" to combine the references. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the pipeline scheme of Rosman in the method of Vetro and Dugad in order to increase computing speed and performance (Vetro, abstract, Dugad, page 213 section 1, Rosman, col. 1 lines 38-42 and col. 11, lines 7-44). Doing so would increase the computing speed for the bilinear interpolation by using the 3D pipeline so that the efficiency of the method is improved. Finally, since the combination of the references takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made which includes in Vetro, Dugad article and Rosman, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper.

**For the above reasons, it is believed that the rejections should be sustained.**

Respectfully submitted

Jingge Wu

Primary Examiner

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